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Thorup 1999-0467A

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Patent Application

Inventor(s)	Mikkel Thorup Bernard Fortz	Case Name	Thorup 1999-0467A
Filing Date	8/5/1999	Serial No.	09/633,882
Examiner	Benjamin R. Bruckart	Group Art Unit	2155
Title	Methods and Systems for Optimizing Network Traffic		

ASSISTANT COMMISSIONER FOR PATENTS

WASHINGTON, D.C. 20231

SIR:

Declaration Pursuant to 37 CFR 1.132

1. My Name is Henry Brendzel.
2. I have an MS degree in Electrical Engineering from MIT (1965), and I worked as an engineer for a number of years, as a Member of the Technical Staff at Bell Telephone Laboratories.
3. I also have a JD degree from Seton Hall University (1975), and as a patent attorney I have prepared a significant number of patent applications in the telecommunications arts.
4. My broad experience makes me a person skilled (marginally) in the art to which the invention identified above pertains.
5. I am an attorney of record in this patent application, although I did not prepare it.
6. I don't recall ever speaking with Messrs Thorup and/or Fortz.
7. In the course of prosecuting the case I read the specification, and it is my view that the specification is sufficient to enable a person skilled in the art to make and use the invention.
8. Specifically in connection with the notion of a best-neighbor search approach, the following should be kept in mind:
    a. When something that is considered a "cost" is a function of n independent variables, one can view this cost as a surface function in n-dimensional space, with the cost value itself being one of the variables. A simple

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illustration of that is the familiar three dimensional space where a surface is a collection of points, and each point is defined by x, y, and z coordinates. One of the coordinates, for example, z is the cost, and that cost is defined by a function in the x and y coordinates. The surface that is so represented can have "hills" and "valleys." A valley can be the lowest valley of them all – thus constituting a global minimum, or it can be not the lowest valley, in which case it is merely a local minimum.

b. A system that that it at some state that corresponds to particular values of the independent variables can be said to be at a point on the surface. Moving from that point to any other adjacent (or almost adjacent) point will result in either a higher value of the cost function, or a lower value of the cost function.

c. The specification teaches that one can proceed from any point of the multi-dimensional surface to a local minimum point by seeking, and iteratively selecting, neighboring points that yield lower cost-function values. In this way, one reaches the bottom of a "valley," which is a local or a global minimum.

d. The specification also teaches that the seeking of the local minimum can be effected by employing some "descent" algorithm, or a "steepest descent" algorithm. The precise algorithm is really not important, as long as the notion is clear. A skilled artisan can select any reasonable algorithm to perform the iterative searches because, basically, one always seeks to "walk down the hill". A simple method would be to evaluate neighboring points and select the first one whose cost is smaller, or evaluate all neighboring points and select the one whose cost is lowest. Clearly, a descent or steepest descent approach will consistently yield the same result from a given starting state.

e. All of the above is well known in the art generally and, in any event, is quite simple and totally understandable from the teachings found in the specification of the above-identified patent application.

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f. A best-neighbor approach, according to the specification, is different in that it allows an iteration to choose a step that results in a cost function value that is higher rather than lower. In other words one is allowed to go uphill.

g. Again, the precise algorithm is not important. What is important is that if the best neighbor approach allows one to go uphill, one can escape a local minimum and find another local minimum that might be a better (i.e., lower cost function value) minimum.

h. In addition to the teachings found in the specification, I note that the best-neighbor approach for finding local minima is not a new concept in the abstract. A "google search" on the phrases "local search" and "best neighbor" resulted in over 500 hits.

i. Based on this understanding of the best-neighbor approach from the teachings in the specification, even without reading any of the above-mentioned teachings that are readily available off the Internet, I know that I can easily create a software module that would perform the iterative best neighbor approach, without undue experimentation.

j. As for the cost function, the specification teaches that a piecewise linear cost function is preferred. An example of such a cost function is given by equation (2) at page 9, and the notion that this example conveys is quite simple: a link that is lightly loaded contributes a small cost, whereas a link that is heavily loaded contributes a high cost. I would have no problem choosing, or creating, a cost function that, for example, is not unlike the cost function illustrated in the specification; and I believe that others who are skilled in the art would similarly find the cost function to be not a problem at all.

Respectfully submitted,

Henry Brendzel 6/27/06

Henry T. Brendzel